

Who Is TeleHub

- Formed in January 1996, after three years of research and development, to introduce the technology capable of integrating the delivery of voice, data, and video services over ATM/IP
- Three basic target markets
 - Services
 - Custom platform
 - Original equipment manufacturer (OEM)



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Corporate Structure

- **TeleHub Communications Corporation (TCC)** is the parent company of two operating subsidiaries

TeleHub Technologies Corp. (TTC)

- **Research and Development**
- **Software and Technology**
- **Customer Platform and OEM Services**

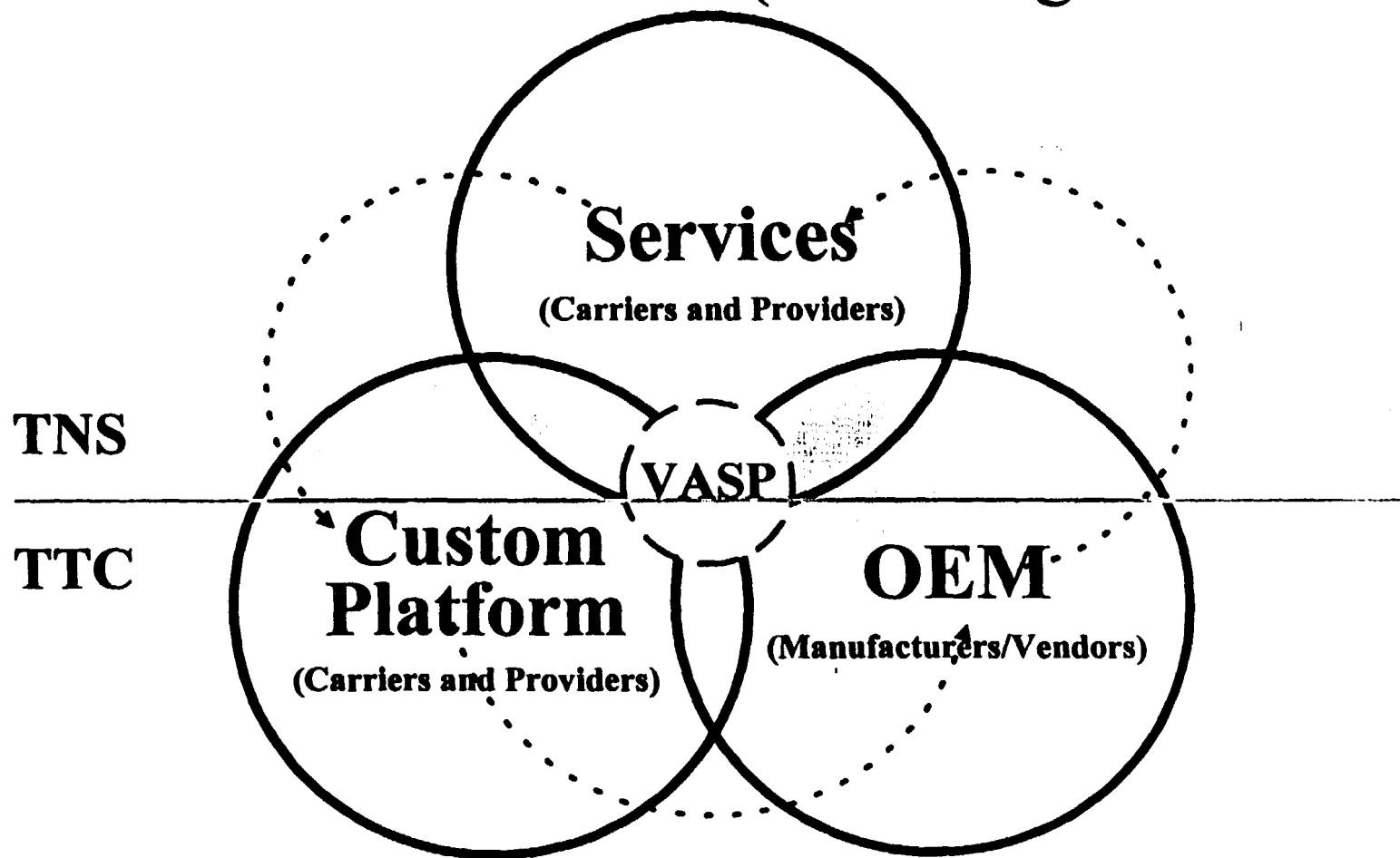
TeleHub Network Services Corp. (TNSC)

- **Transport Services**
- **Mediated Services**
- **Network Operations**



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TeleHub Product Sets (And Target Markets)



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The Technology Play

- Industry has embraced ATM/IP as network technology
 - Current service providers face negative financial implications to upgrade their current systems
 - TeleHub has taken advantage of a “clean slate” strategy
 - Service providers require “switched and dedicated” access for integrated voice, data, and video access for ATM/IP transport services



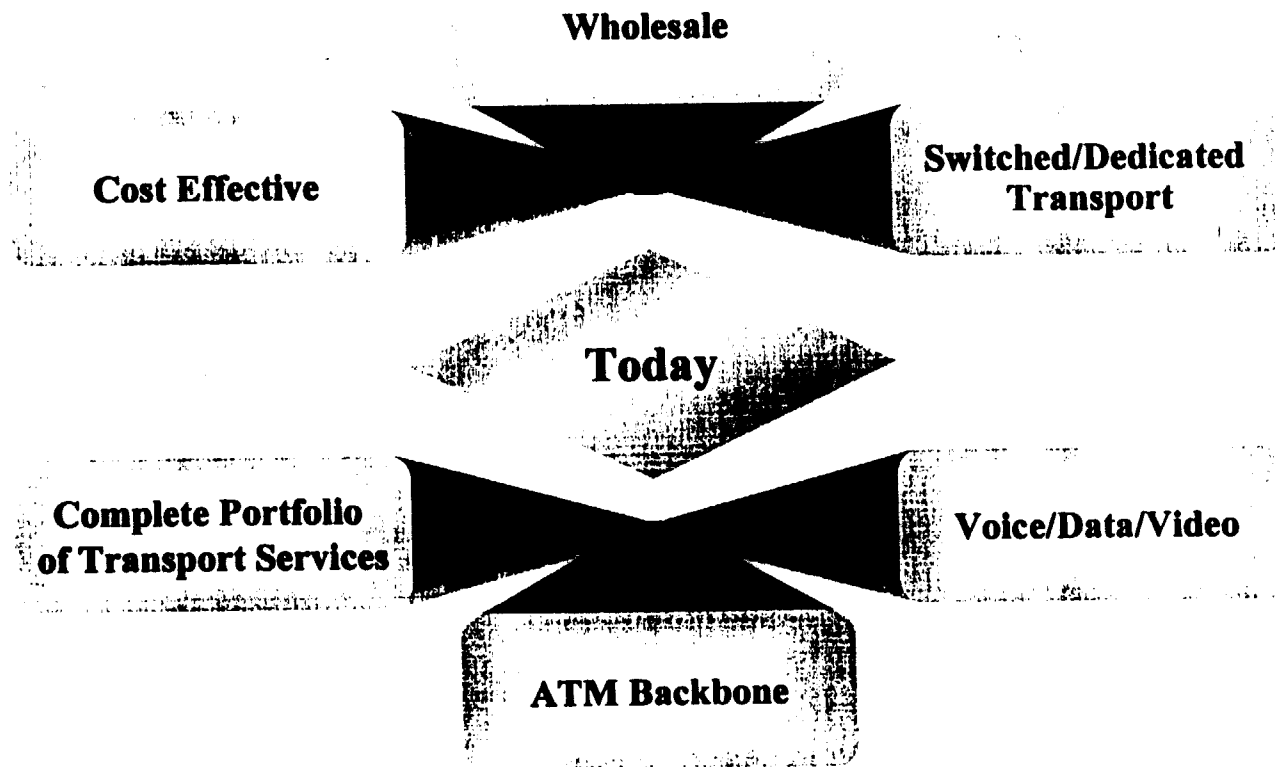
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The Technology Play



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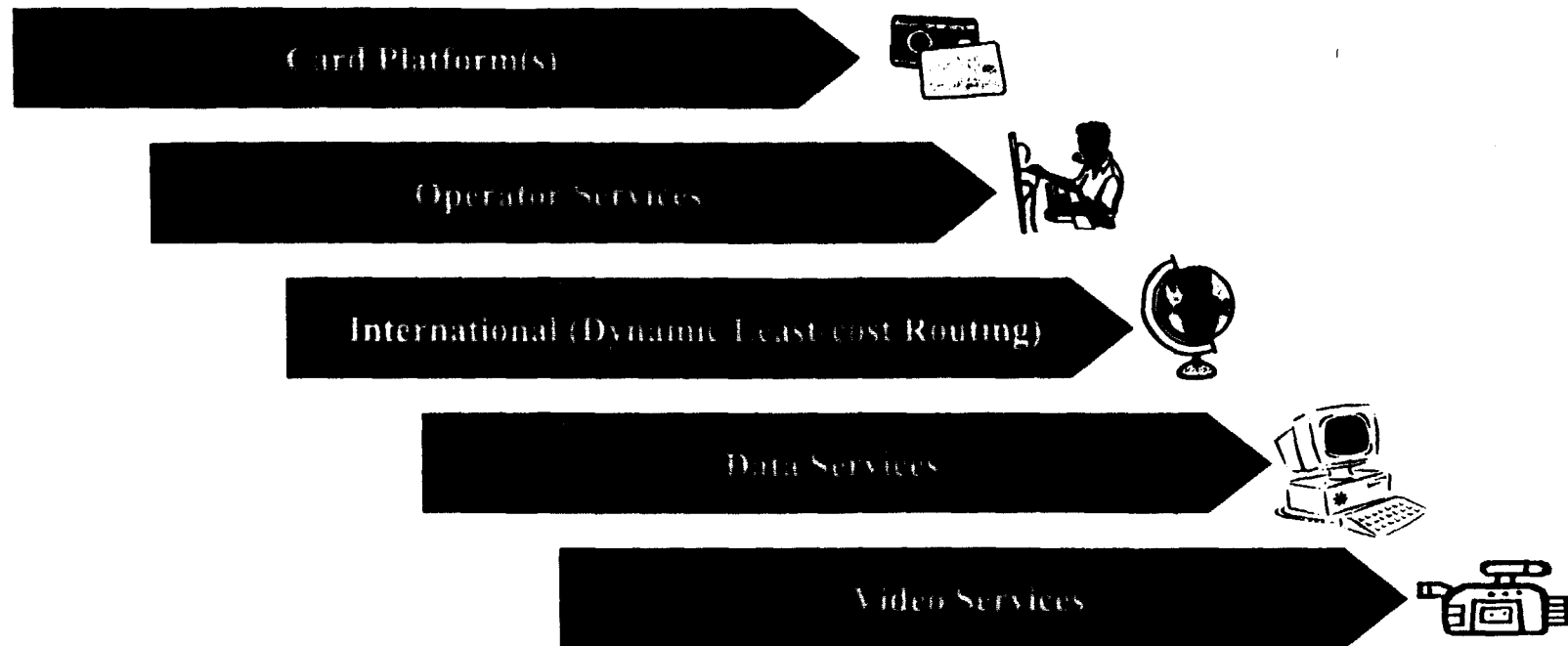
TeleHub Network Services Goals



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TeleHub Network Services Goals

- Access to service functionality that will enhance our customers opportunities and capabilities for sales



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TeleHub Network Services Goals

- Access to new capabilities as TeleHub technology evolves

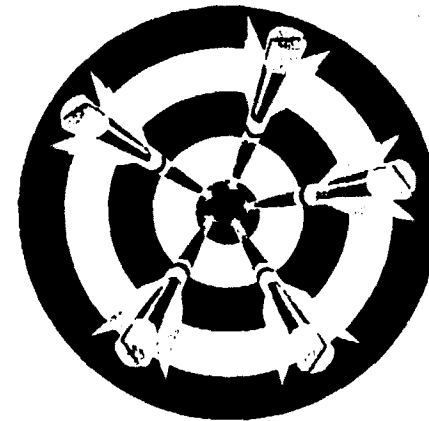


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TeleHub Network Services

Target Markets

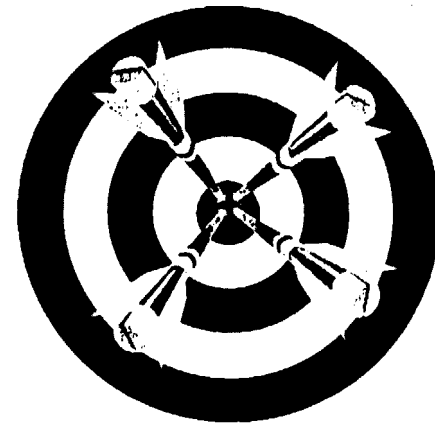
- **Wholesale Transport Network**
 - Switchless resellers
 - Small interexchange carriers
 - Competitive local exchange carriers
 - Independent local exchange providers
 - Signaling service providers



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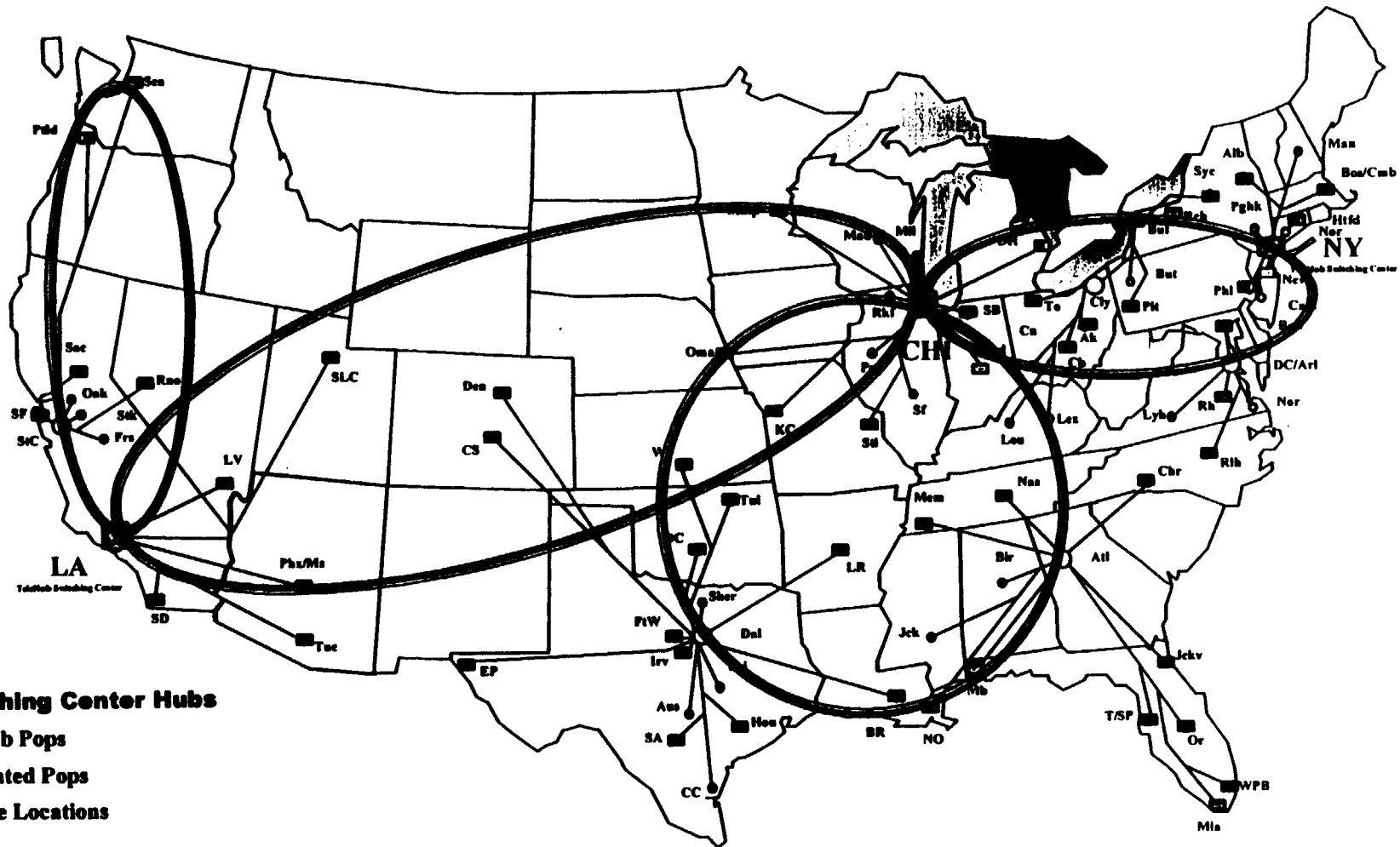
TeleHub Network Services Target Markets

- **Mediated Access Services**
 - All Wholesale Transport Network markets
 - LECs in new markets
 - Large interexchange carriers
 - Unbundled Local Access Network Services



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TNS VASP ATM/IP Network



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Virtual Access Services Platform

- VASP is a fully distributed and fault-tolerant network platform that acts as a “supervisory shell” to underlying signaling and transport networks
- VASP offers customers access to services without major capital expenditures
 - No proprietary access required
 - Transport efficiencies
 - Access to enhanced services
 - Provides sophisticated management, billing, and control capabilities
 - Accelerates market entry for competitive providers



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VASP Architecture

- **Service Management System (SMS):**
 - Houses all the fundamental database support functions of the network, including features, functions, and various customer information
- **Network Control Point (NCP):**
 - NCP is the engine that drives the service logic and processing
- **Master Element Manager (MEM):**
 - MEM is the routing engine for all network transactions



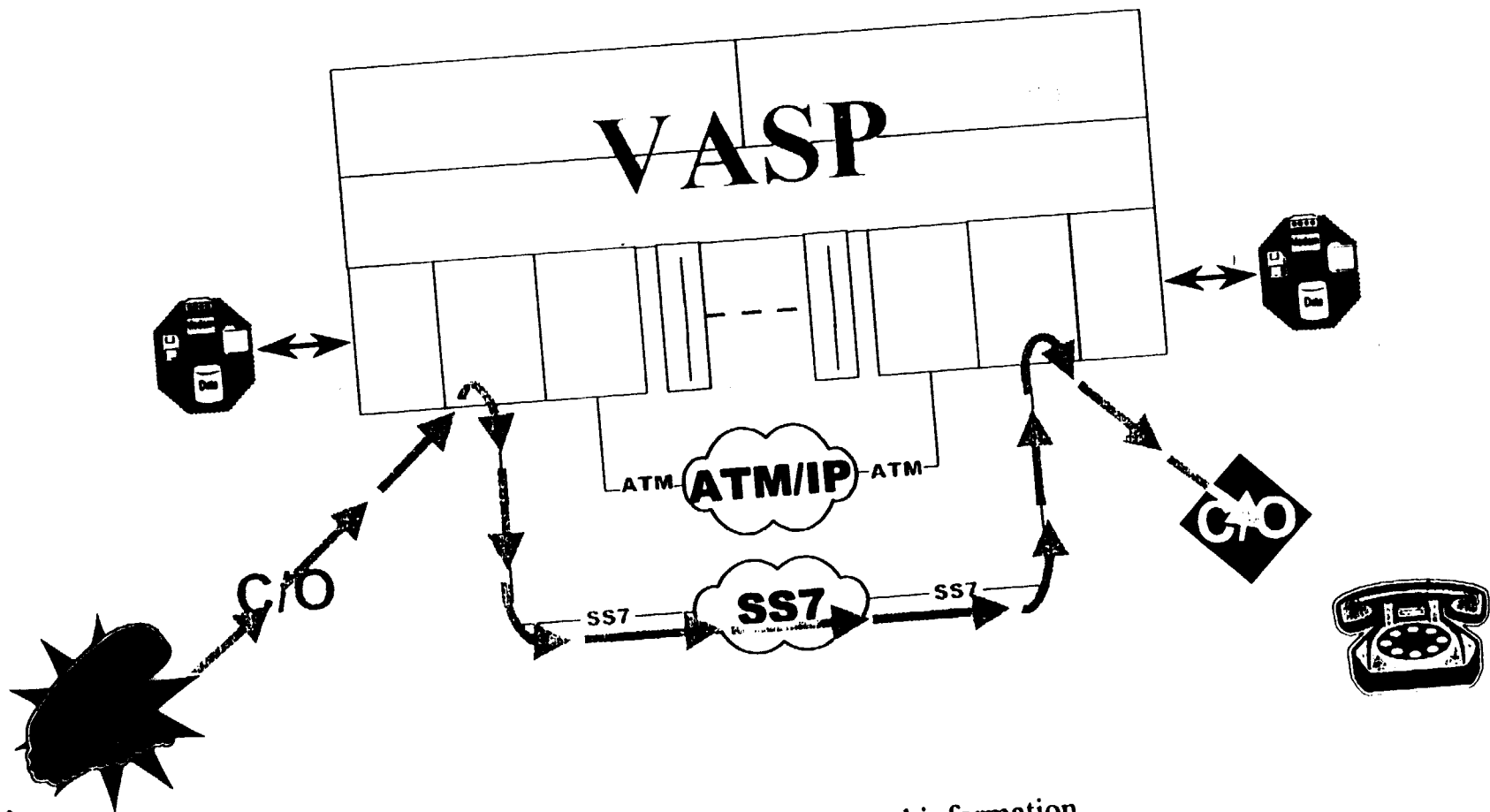
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VASP Architecture

- **Transport Element Manager (TEM):**
 - Manages the transport layer of the network via legacy interfaces (DS-0 thru OC-12) to the ATM/IP network hierarchy
- **Signaling Element Manager (SEM):**
 - Manages the signaling layer of the network via legacy SS7, ATM/IP and other advanced signaling protocols
- **Interface Element Manager (IEM):**
 - Manages the interface layer for the support systems interfacing to the advanced VASP database logic (OSS, SMS, Billing platforms, PIC / CARE, ... etc.)

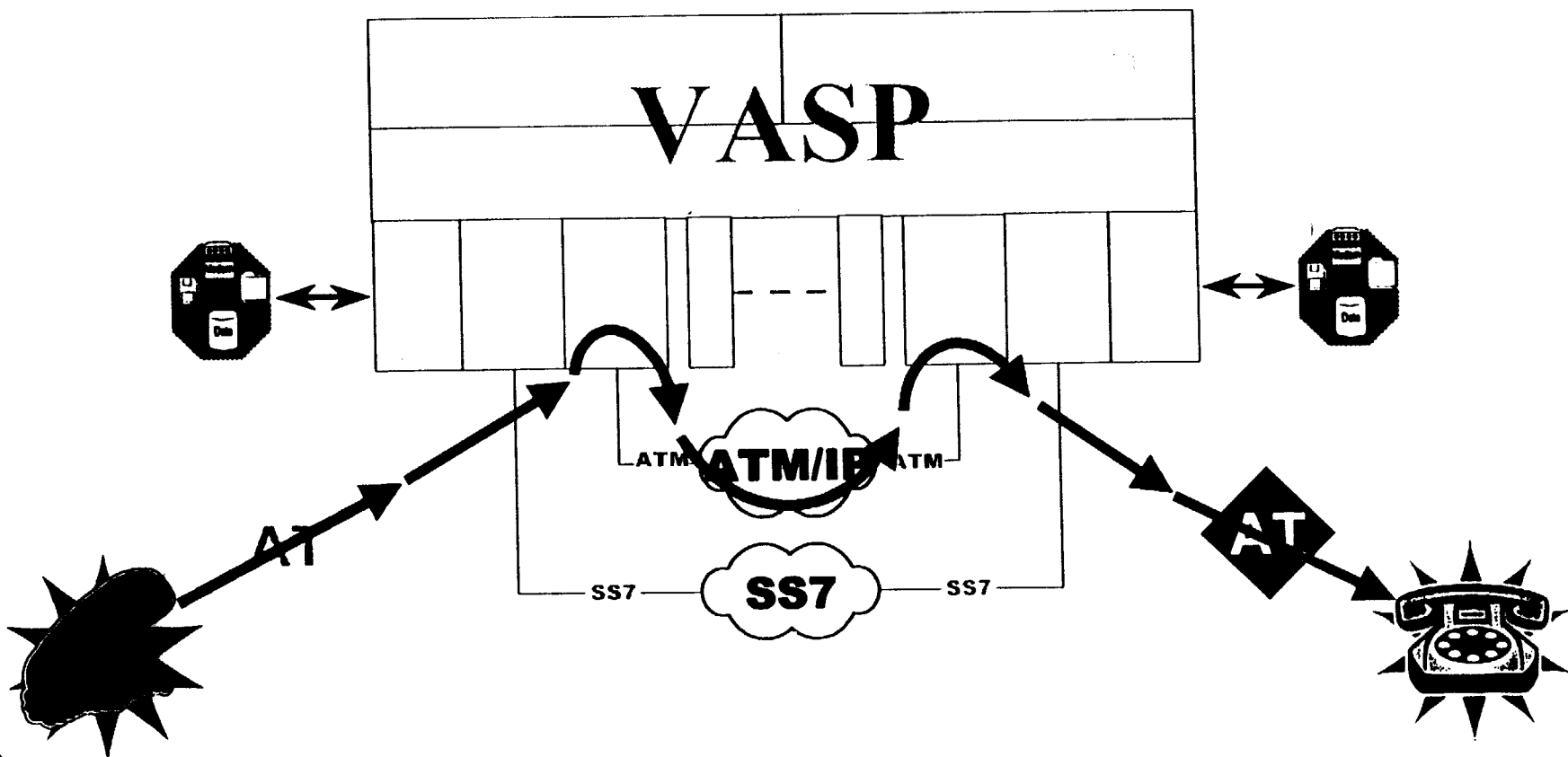


VASP Architecture



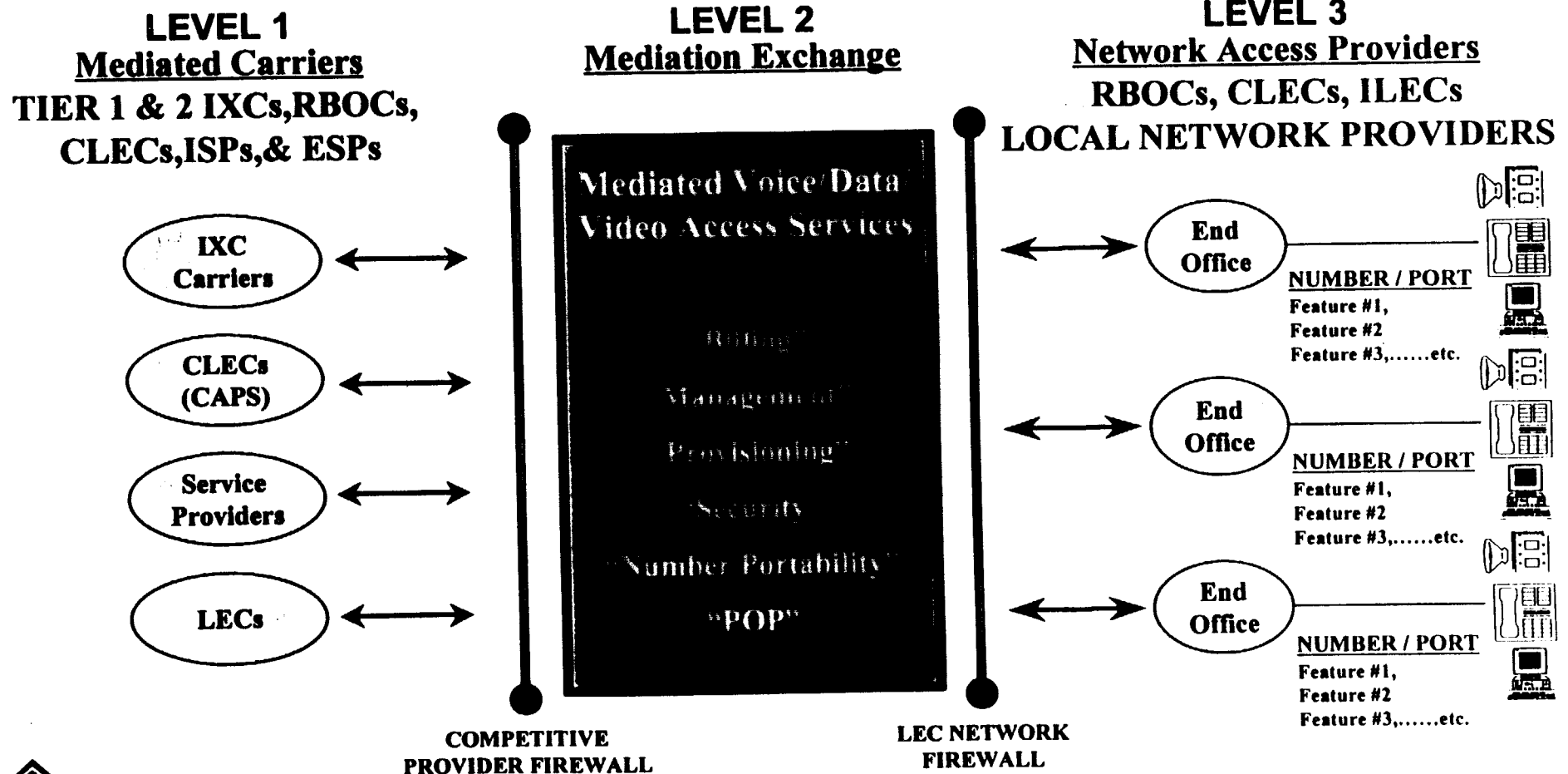
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VASP Architecture



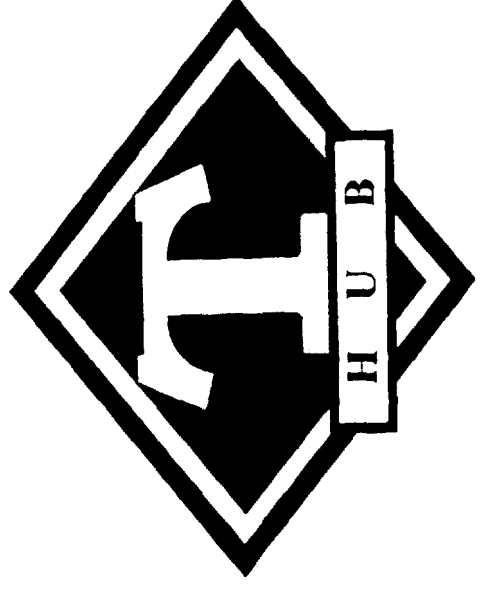
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Mediation Layout



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TeleHub's IP Exchange Strategy





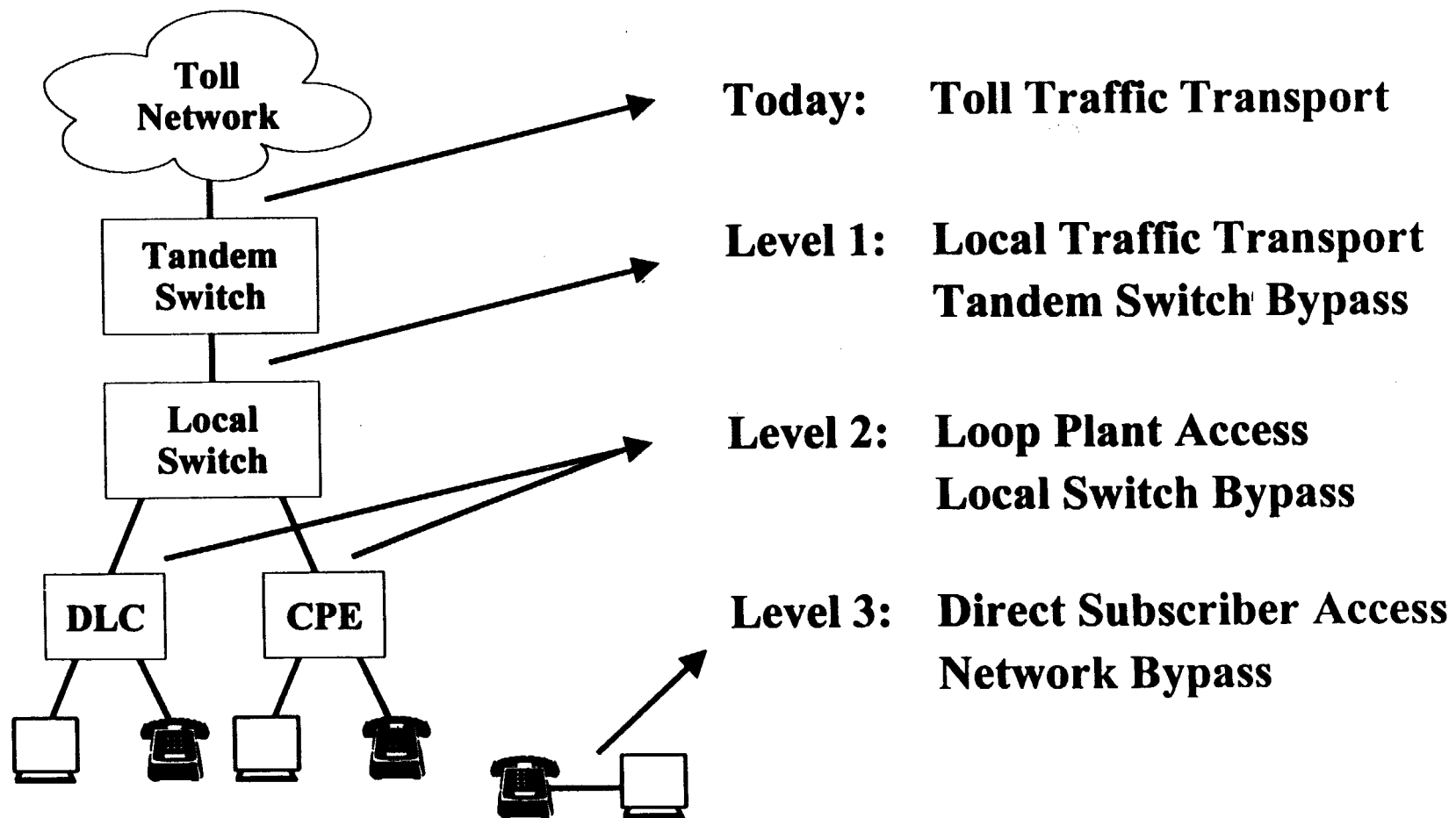
What Is IP Exchange

- A Technology that will enable service providers to deliver the full range of services on a ubiquitous basis
- A Paradigm shift in transport services
 - Migration from the existing legacy environment
 - Secure IP Environment
 - Dynamic IN (Intelligent Network) Platform
 - Open, off-the-shelf architecture



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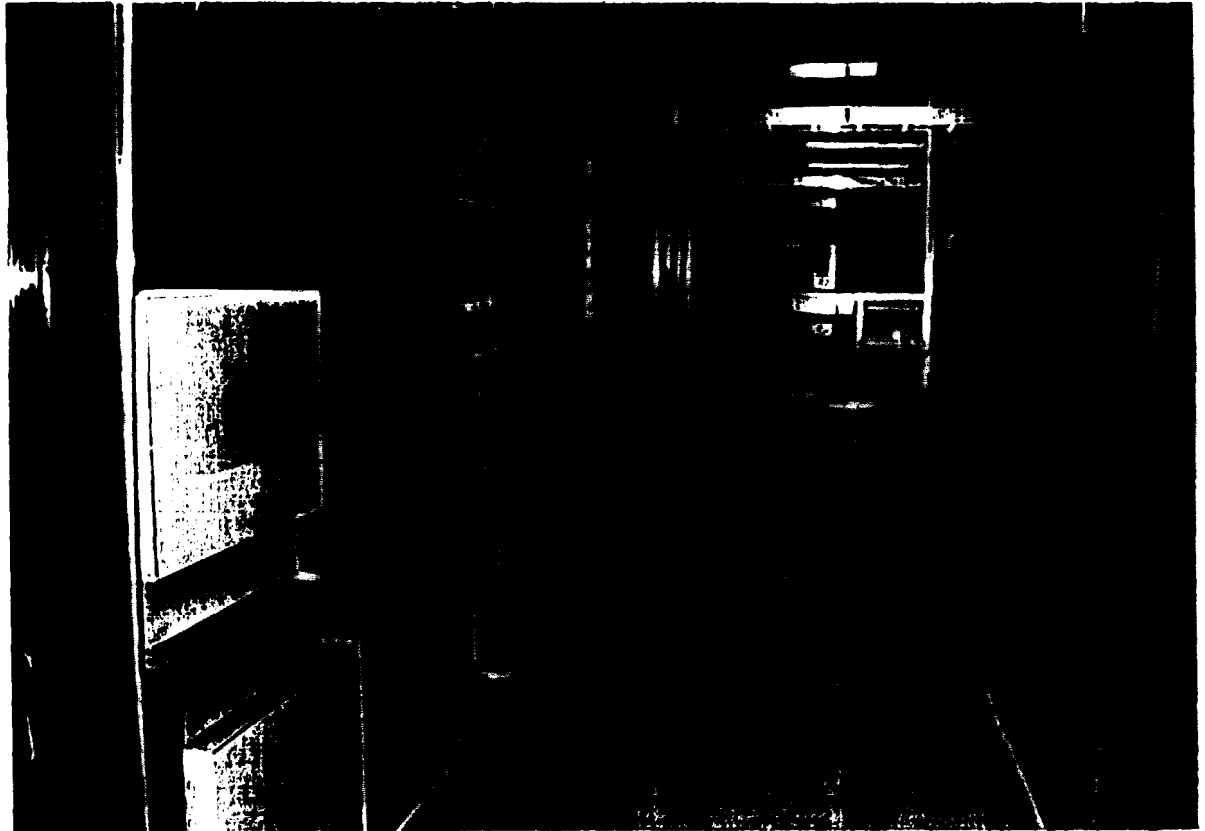
IP Exchange Migration Strategy



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Gurnee Location Lab

- Pre-installation equipment and program testing
- Engineering and technical training



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SS7 Transaction

- Provides a “Call Detail” record, including the Calling Number, Dialed Number, Charged Number, and the Virtual Routing Number (VRN)

Page	Page	Page	Page
0001	0002	0003	0004
0005	0006	0007	0008
0009	0010	0011	0012
0013	0014	0015	0016
0017	0018	0019	0020
0021	0022	0023	0024
0025	0026	0027	0028
0029	0030	0031	0032
0033	0034	0035	0036
0037	0038	0039	0040
0041	0042	0043	0044
0045	0046	0047	0048
0049	0050	0051	0052
0053	0054	0055	0056
0057	0058	0059	0060
0061	0062	0063	0064
0065	0066	0067	0068
0069	0070	0071	0072
0073	0074	0075	0076
0077	0078	0079	0080
0081	0082	0083	0084
0085	0086	0087	0088
0089	0090	0091	0092
0093	0094	0095	0096
0097	0098	0099	0100



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SS7 Messages

- Details SS7 messages from the IAM to the release

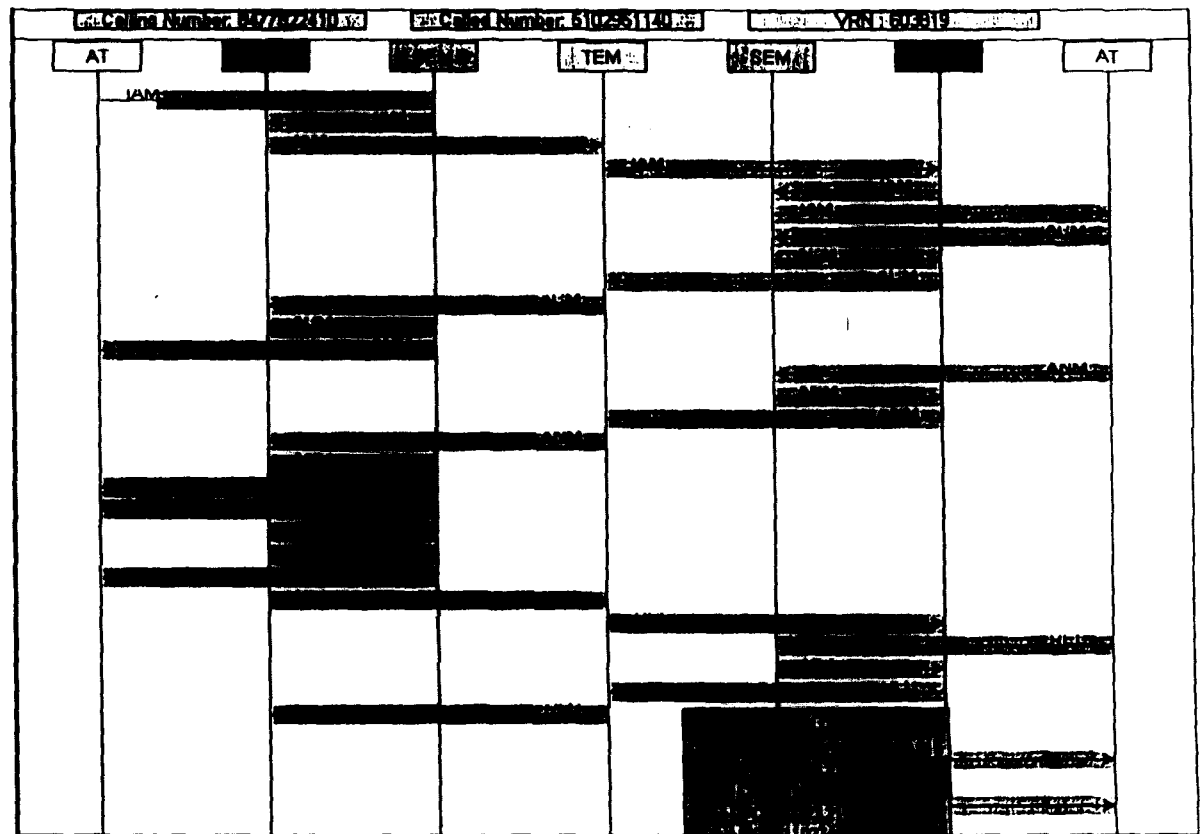
SS7 Message Type			
0001	Access	SEM Process 83	04/03/98 17:32:51.362 250.130.1 1 1,223.21 365
0004	Transport	SEM Process 85	04/03/98 17:32:53.880 1,223.21 11027 1,223.23 1102
0004	Exit	SEM Process 824	04/03/98 17:32:53.870 1,223.23 967 251.41.2 55
0004		SEM Process 824	04/03/98 17:32:54.963 251.41.2 55 1,223.23 967
0004		SEM Process 83	04/03/98 17:32:54.798 1,223.23 11027 1,223.21 1102
0004		SEM Process 824	04/03/98 17:32:54.804 1,223.21 365 250.130.1 1
0004		SEM Process 85	04/03/98 17:33:13.532 251.41.2 55 1,223.23 967
0004		SEM Process 85	04/03/98 17:33:13.761 1,223.23 11027 1,223.21 1102
0004		SEM Process 83	04/03/98 17:33:13.927 1,223.21 365 250.130.1 1
0004		SEM Process 83	04/03/98 17:36:09.416 250.130.1 1 1,223.21 365
0004		SEM Process 83	04/03/98 17:36:09.576 1,223.21 365 250.130.1 1
0004		SEM Process 85	04/03/98 17:36:09.599 1,223.21 11027 1,223.23 1102
0004		SEM Process 824	04/03/98 17:36:09.735 251.41.2 55 1,223.23 967
0004		SEM Process 85	04/03/98 17:36:09.915 1,223.23 11027 1,223.21 1102
0004		SEM Process 824	04/03/98 17:36:09.927 1,223.23 967 251.41.2 55
0004		SEM Process 824	04/03/98 17:36:09.958 1,223.23 967 251.41.2 55



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Message State Diagram

- Graphical display of the SS7 transaction, broken down from the initial call message to the CIC code



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Call Detail Record

- Provides a detailed record of calls that can be utilized as a log-in system or dedicated to a network
 - Tracks the call duration in seconds

TeleHub Wholesale Billing - Call Detail Record



4/1/98

START TIME	CALL DURATION (Seconds)	CARRIER	ORIGINATING NUMBER	TERMINATING NUMBER	BILLED NUMBER	CALL TYPE
04/01/98 17:32:33	234	TeleHub	0417-763-2000	510-205-1140	0417-300-2000	1



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